IN THE ABSTRACT:

Please substitute the new Abstract of the Disclosure submitted herewith on a separate page for the original Abstract presently in the application.

REMARKS

Entry of the amendments to the specification and claims, (noting that claim 1 was amended by way of Annexes to the International Preliminary Examination Report for PCT/DE00/02609), before examination of the application in the U.S. National Phase is respectfully requested. If there are any questions regarding this Preliminary Amendment or this application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #127FR/50898).

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

Please amend claims 1-17 as follows:

1. (Amended) [Sensor] A sensor element for electrically measuring the position of liquid levels, [having] comprising:

a substrate [(2)]; and

a plurality of electrodes [(3) that can be] adapted to be contacted individually and [that are] mounted on the substrate, [whereby] wherein the electrodes comprise sensor-active partial electrodes [(5)] that are networked with electrical connections [(7)], and wherein [whereby] the partial electrodes of two respective electrodes are always positioned opposite one another, separated by a distance, [as] to form partial electrode pairs [(11)], and the electrode pairs [(8)] thus formed recur periodically over [the] a length of the sensor element.

2. [Sensor] The sensor element according to Claim 1, [characterized in that] wherein the electrical connections [(7)] of the networked partial electrodes are coated with a passivating layer [(6)].

3. [Sensor] The sensor element according to [one of Claims 1 or 2, characterized in that] Claim 1, wherein the partial electrodes positioned pairwise opposite one another are always at least one of separated by the same distance, and[/or] the distances between the partial electrode pairs in the longitudinal direction of the sensor element are constant over the entire length of the sensor element, and/or the number of partial electrode pairs per electrode pair is constant.

4. [Sensor] The sensor element according to [at least one of Claims 1 through 3, characterized in that] Claim 1, wherein the distance between the

partial electrode pairs in the longitudinal direction is [in the range of] approxiamatley100 µm.

5. [Sensor] The sensor element according to [at least one of Claims 1 through 4, characterized in that] Claim 1, wherein the substrate is made of one of silicon, glass, [or] and plastic.

6. [Sensor] The sensor element according to [at least one of Claims 1 through 5, characterized in that] Claim 1, wherein the electrodes are made of one of platinum, iridium, [or] and gold.

7. [Sensor] The element according to [at least one of Claims 1 through 6, characterized in that] Claim 1, wherein the sensor chip surface has wetting properties such that the boundaries of the liquid wetting of the sensor surface correspond to the liquid level.

8. [Arrangement in which the sensor element according to at least one of Claims 1 through 7 is used] An arrangement for measuring a capillary filling, [characterized in that] including a sensor element for electrically measuring the position of liquid levels, comprising

a substrate; and

a plurality of electrodes adapted to be contacted individually and mounted on the substrate,

wherein the electrodes comprise sensor-active partial electrodes that are networked with electrical connections, and wherein the partial electrodes of two respective electrodes are always positioned opposite one another, separated by a distance, to form partial electrode pairs, and the electrode pairs thus formed recur periodically over a length of the sensor element, wherein the sensor element is attached to a capillary in such a way that the sensor-active partial

electrodes [(5)] are situated inside the capillary and the electrical connection options are situated outside the capillary, and that at least one conductivity boundary of the capillary filling is located in the region of the sensor element.

9. [Arrangement in which the sensor element is used according to at least one of Claims 1 through 7 and] The arrangement according to Claim 8, [characterized in that] wherein two conductivity boundaries of operating liquids in the capillary form a bubble in the region of the sensor element, said bubble being bounded on both sides by the operating liquid.

10. [Arrangement in which the sensor element is used according to at least one of Claims 1 through 7 and Claims 8 or 9, characterized in that] The arrangement according to Claim 8, wherein at least one of the bubble is filled with gas, and[/or] the length of the bubble is approximately twice the length of an electrode pair in the longitudinal direction, and[/or] the same operating liquid is present on both sides of the bubble.

11. [Method] A method for measuring liquid levels using [the arrangement according to at least one of Claims 1 through 8 and 9 and/or 10, characterized in that it is determined which] a sensor element for electrically measuring the position of liquid levels, comprising

a substrate; and

a plurality of electrodes adopted to be contacted individually and that are mounted on the substrate, wherein the electrodes comprise sensor-active partial electrodes that are networked with electrical connections, wherein the partial electrodes of two respective electrodes are always positioned opposite one another, separated by a distance, to form partial electrode pairs,

and the electrode pairs thus formed recur periodically over a length of the sensor element comprising the steps of:

determining which electrode pairs are covered and which are not covered by [the] an operating liquid by measuring the resistance of each individual electrode pair in [the] an idle state of the operating liquid; [and]

comparing the resistance values to [the] characteristic minimum and maximum values for liquid coverage or no liquid coverage[,]; and

detecting from this information the position of the conductivity boundary or of the bubble on a specific electrode pair [is detected].

12. [Method] A method for measuring liquid levels using [the arrangement according to at least one of Claims 1 through 8 and 9 and/or 10, characterized in that the position of a conductivity boundary within an electrode pair in the idle state of the operating liquid is determined by] a sensor element for electrically measuring the position of liquid levels, comprising

a substrate; and

a plurality of electrodes adapted to be contacted individually and mounted on the substrate,

wherein the electrodes comprise sensor-active partial electrodes that are networked with electrical connections, and wherein the partial electrodes of two respective electrodes are always positioned opposite one another, separated by a distance, to form partial electrode pairs,

and the electrode pairs thus formed recur periodically over a length of the sensor element comprising the steps of:

comparing the intermediate value lying between the minimum and maximum resistance value of the electrode pair to a reference resistance curve of the electrode pair[,]; and

obtaining the position of the conductivity boundary for a specific partial electrode pair from said step of comparing [is thereby obtained].

13. [Method] The method according to [at least one of Claims 11 or 12, characterized in that] Claim 11, wherein the path distance traveled by the bubble is determined from the detected position of the bubble or of the conductivity boundary before and after movement of the bubble.

/114. [Method] A method for measuring liquid levels using [the arrangement according to at least one of Claims 1 through 8 and 9 and/or 10, characterized in that] a sensor element for electrically measuring the position of liquid levels, comprising

a substrate; and

a plurality of electrodes adapted to be contacted individually and mounted on the substrate, wherein the electrodes comprise sensor-active partial electrodes that are networked with electrical connections, and wherein the partial electrodes of two respective electrodes are always positioned opposite one another, separated by a distance, to form partial electrode pairs, and the electrode pairs thus formed recur periodically over a length of the sensor element comprising the steps of:

jumps in the resistance values upon movement of a bubble [are detected] by parallel monitoring of the resistance values of all electrode pairs[,]; and

determining the path distance traveled by the bubble [is determined] from the number of jumps.

15. [Method] The method according to [at least one of Claims 13 or 14, characterized in that] Claim 13, wherein the displaced liquid volume is determined from the path distance traveled.

16. [Method] The method according to [at least one of Claims 11 through 15, characterized in that] Claim 11, wherein the resistance measurement of the electrode pairs is performed by measuring the resulting current after an alternating current is applied to the electrodes.

17. [Method] The method according to Claim 16, [characterized in that] wherein the alternating current has a frequency in the kilohertz range and/or an amplitude in the range of 100 millivolts.